

rounded form, and consists of a few closely packed but well-defined cells, which are very much shorter than the other cells of the hair. The elongated cells of the body of the hair (of which the lower one is most characteristic on account of its very large size), contain fine colourless, granular matter, and generally nuclei; but the secreting cells are well furnished with colouring matter of a reddish-brown, but sometimes of a green colour. A one-inch object-glass, recommended for the examination of tobacco, is usually insufficient to show the *structure* of the gland, and the mere presence of 'glandular hairs' proves nothing, these being common in plants. It is also necessary to keep in view that many small hairs occur on tobacco-leaves which are normally without glands. The glandular hairs are most abundant at the tips of the shoots, and especially on the calyx and flower-stalks of the tobacco. To the fact that epidermal hairs are so frequently organs of secretion, Gasparrini has recently added the additional one, that they are also the organs of absorption.

4. "Notice of Galls found on the Leaves of the Beech," by Mr. James Hardy.

GEOLOGICAL SOCIETY.

January 6, 1858.—Major-General Portlock, LL.D., President, in the Chair.

The following communications were read :—

1. "On *Cephalaspis* and *Pteraspis*." By Prof. Huxley, F.R.S., F.G.S.

Of the four species originally included by Prof. Agassiz in the genus *Cephalaspis*, two, *C. Lloydii* and *C. Lewisii*, are so different from the others that the possibility of their proving generically distinct is hinted at in the 'Recherches sur les Poissons Fossiles.'

Subsequently M. Kner endeavoured to prove that these two species are not fish-remains at all, but are the internal shells of a Cephalopod, for which he proposed the generic name of *Pteraspis*.

Roemer has still more recently expressed the opinion that the *Pteraspides* are *Crustacea*. These conflicting opinions clearly indicate the necessity of revising and comparing anew the characters of the different species of *Cephalaspis* and *Pteraspis*. And a still greater interest is lent to the inquiry into the true nature of *Pteraspis*, from the fact that species of this genus are now known to occur in undoubtedly Upper Silurian rocks. As the evidence stands at present, they are, if fish, among the oldest (and nearly the very oldest) representatives of their class.

In undertaking this inquiry, the author of the present paper considered it desirable, in the first place, to determine with precision the microscopical characters of the shield of *Cephalaspis*. This shield is exceedingly thin, nowhere exceeding $\frac{1}{40}$ th of an inch in thickness on the dorsal surface, and on the ventral suddenly thinning off a little way from the margin into a mere membrane.

The subjacent cranium appears to have been wholly composed of cartilaginous or soft fibrous tissue; for the "layer of fibrous bone,"

which has been said to exist immediately beneath the shield, is in reality nothing more than the matrix, which in these fossils, as in others, is stained of a deep reddish-brown colour in the immediate neighbourhood of the animal substance; the "fibres" of the supposed bone are casts of the radiating semi-canal or grooves on the under surface of the shield.

The shield consists of three principal layers; the outermost is distinctly laminated, and contains numerous osseous lacunæ, whose long axes are disposed at a considerable angle to one another in the successive layers, as in *Megalichthys*. The lamellæ and lacunæ disappear in the middle and outer layers. The latter is arranged in irregular tubercles, consisting of a substance very similar to the "Kosmine" of Prof. Williamson. The inner openings of numerous vascular canals are seen as points scattered over the inner surface of the shield. These canals traverse the inner layer obliquely, and then ramify in the middle layer in a very peculiar manner, described at length in the paper.

It is from the disposition of these vascular ramifications that the appearance of distinct ossicles or scales, interlocking by sutures, which has been described, arises. The entire absence of any such appearance of sutures on the inner surface of the shield is, indeed, alone sufficient to prove that it is not composed of distinct scales.

In the shield of *Pteraspis* three principal layers are similarly discoverable: the inner is very distinctly laminated; the outer, almost wholly constituted by the characteristic "enamel-ridges," consists of Kosmine. Vascular canals pass from the inner surface, and ramify in the middle layer, terminating in cæca in the outer layer, as in *Cephalaspis*.

But there are no osseous lacunæ; and the vascular canals communicate with large polygonal cells (which were either empty, or more or less occupied by membranous substance in the recent state) situated in the inner part of the middle layer.

Specimens were exhibited in which these cellular cavities were empty; but ordinarily they are filled with the matrix, which then assumes the form of polygonal prisms separated by the thin walls of the cells. It is these prisms which have been mistaken for part of the bony structure itself.

On examining a thin section of one of M. Kner's specimens (for which the author is indebted to the liberality of Sir P. Egerton), the structure, though much altered, showed sufficient similarity to that of the specimens of *C. Lloydii* in the Museum of the Society to leave no doubt as to the generic identity of the two.

The microscopic examination of *Pteraspis* demonstrates its unquestionably piscine nature; and shows that, while in many respects similar to *Cephalaspis*, the species included under *Pteraspis* are rightly separated from the others. The leading distinctive characters of the former are the absence of osseous lacunæ,—the cellular character of the middle layer,—and the ridged and not tuberculated enamel.

In conclusion, the author inquired into the evidence of the Ganoid nature of the *Cephalaspida*, and into the value of the relative and

absolute development of the endo- and exo-skeletons in fishes, considered as indications of the perfection of their general organization.

2. "On a New Species of *Plesiosaurus*; with Remarks on the Structure of the Atlas and Axis, and of the Cranium in that genus." By Prof. Huxley, F.R.S., F.G.S.

The specimen which is the subject of the present paper was procured at Street, near Glastonbury. It is now in the Collection of the Museum of Practical Geology, Jermyn Street, and will be described at length in the Decades of the Geological Survey.

It approaches most nearly to *P. Hawkinsii*; but the head is smaller in proportion to the body and neck, and the number of the cervical and dorsal vertebræ is different, there being altogether fifty-three cervico-dorsal vertebræ, of which thirty are cervical; while in *P. Hawkinsii* the cervical vertebræ are thirty-one, and the dorsal at least twenty-three. For this species, characterized by fifty-three cervico-dorsal vertebræ,—by a cranium at most not more than $\frac{1}{12}$ th of the length of the body, and by having the anterior thirty vertebræ fully, or more than, equal to four lengths of the cranium, the name of *P. Etheridgii* is proposed. Its dimensions are nearly the same as those of *P. Hawkinsii*, its length being between 7 and 8 feet.

By a happy accident the only displacement in the whole length of the vertebral column of this specimen has taken place between the head and the atlas and axis, on the one hand, and between the latter and the third cervical vertebra on the other. By a little careful clearing away of the surrounding parts, it has thus been possible to expose the atlas and axis very easily. They are, as Prof. Owen has stated to be their character in this genus, ankylosed; but their structure is totally different from what is seen in the *Ichthyosaurus*, and closely resembles that of the corresponding parts in the Crocodile. An os odontoideum, very similar to that in the Crocodile, represents, as Rathke long since demonstrated in other *Reptilia*, the central portion of the body of the atlas; while its cortical inferior portion and its neural arches form an anterior articular cup for the occipital condyle, as in the Crocodile.

The author next adverts to the many points of structural correspondence observable between *Plesiosaurus* and *Teleosaurus*, not only as regards the atlas and axis, but as respects the cranium.

The existence of a distinct jugal and squamosal, and of a union between the latter and the post-frontal, and the consequent subdivision of the temporal fossa, as in the Crocodile, are indicated. The extension of the exoccipitals and of the pterygoids to the os quadratum is adverted to; and the very backward position of the posterior nares ascribed to *Plesiosaurus* is questioned. Teleologically, such an arrangement appears not very comprehensible: and, on morphological grounds, it is unlikely; for the posterior nares are more forward on the base of the skull in *Gavialis* than in *Crocodilus*, and far more forward in *Teleosaurus* than in *Gavialis*. It seems more probable that the so-called posterior nares of *Plesiosaurus* correspond with the deep fossæ on either side of a prominent median ridge visible on the under surface of the basisphenoid of *Teleosaurus*.

The petrosal bone, completely covered externally by the quadratum in *Crocodylus*, is partially exposed in *Gavialis*, and completely so in *Teleosaurus* and in *Plesiosaurus*.

Similar comparisons were pursued with respect to other parts; and it is shown that in many respects the *Teleosauria* bridge over the gap between the long-necked *Enaliosauria* and the existing *Crocodylia*,—a conclusion not without interest, when the relations in time of the two orders are considered.

MISCELLANEOUS.

List of Diatomaceæ, &c., found in Ceylon. By Dr. KELAART.

Amphora, sp.	Gyrosigma tenuissimum.
Eunotia amphioxys.	—— lacustre.
Himantidium gracile.	Tryblionella, sp.
—— arcus.	Amphipleura, sp.
Navicula firma.	Atrikostoma falcatum.
—— serians.	—————
—— lævissima.	
—— bifrons.	
—— rhomboides.	Vorticella nebulifera.
Stauroneis gracilis.	Carchesium polypinum.
Pinnularia acuminata.	Arcella enchelys.
—— mesolepta.	Trachelocerca biceps.
—— viridis.	Euglenia, sp.
—— viridula.	Chætophyta cinnamomea, sp. n.
—— gibba.	Difflugia liosoma.
Surirella panduriformis.	—— Lioptomum.
Nitzschia curvula.	Trachelomonas gigas.
Melosira distans.	—— lævis.
Hanoptera semen.	—— granulata.
Three species of Nitzschia,	—— nigra.
probably new.	

On the Claws of the Spiders of the genus Mygale. By M. H. LUCAS.

M. Lucas has recently stated to the Academy of Sciences in Paris, that the claws of the tarsi of the *Mygale Blondii* and *M. nigra*, which are inserted above the tarsus, are very mobile, and that they are exerted or retracted by the animal at pleasure, somewhat in the same way as those of the carnivorous mammals of the genus *Felis*. He has also observed that in these species the hooks of the mandibles are but slightly moveable, and that they are not developed to the same extent as in many other spiders, such as those of the genera *Segestria*, *Epeira*, *Tegenaria*, &c.

During his stay in Algeria on two occasions, M. Lucas had the opportunity of examining several species of the genus *Mygale*, amongst others *M. barbara*, *gracilipes*, and *africana*, and in these he observed that the claws were terminal and non-retractile. In these species also the hooks of the mandibles are greatly developed, and serve